

Remarks

The Applicants have amended Claim 1 by incorporating the subject matter of Claim 2. Also, Claim 1 has been amended to recite that the flame-resistant polymer is soluable in a polar organic solvent. Support for that change may be found in Claim 3, for example. Claim 2 has been cancelled in view of the incorporation of the subject matter of that claim into Claim 1.

Claim 3 has been amended to include the subject matter of Claim 7. Claim 7 has accordingly been cancelled.

Claim 11 has been amended in a manner similar to Claim 1. In particular, Claim 11 now includes the subject matter of Claim 2 and also recites that the flame-resistant polymer is soluble in a polar organic solvent.

Finally, Claim 18 has been amended to include the subject matter of Claim 2.

Claims 14-17 and 21 have been cancelled. Those claims are cancelled without prejudice and without disclaimer of the subject matter therein. The Applicants specifically reserve the right to file one or more divisional applications directed to the subject matter of those claims.

Claims 18-20 and 22 stand objected to under 37 C.F.R. 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 18 has been amended to be independent and Claims 19, 20, and 22 depend on Claim 18. The Applicants respectfully submit that Claims 18-20 and 22 now satisfy the requirements of 37 C.F.R. §1.75(c).

Claims 1-3, 7, 11-13, 18-20 and 22 stand rejected under 35 USC §102(b) as anticipated by Ono, which discloses a process for producing fireproof fibers. The rejection states that Ono teaches a process for treating an acrylic fiber dissolved in dimethylformamide with hydroxylamine. The Applicants respectfully submit that Ono does not disclose the flame-

resistant polymer-containing solution recited in those rejected claims. Instead, Ono teaches a process for modifying an acrylic fiber to confer flame-resistant properties.

As a preliminary matter, the Applicants provide a solution containing a flame-resistant polymer moldable into various shapes as described below. The use of such a flame-resistant polymer results in flame-resistant molded products in unprecedented shapes. Such flame-resistant molded products can directly be carbonized and carbon molded products in various shapes can efficiently be manufactured.

Ono discloses the following process from Claim 1. The process comprises contacting an acrylic fiber with hydroxylamine to effect chemical reaction at a pH of not higher than 7 at a temperature of below 200°C for a time sufficient that the contacted fiber has a solubility of not more than 50% in dimethylformamide at 90°C and heating the contacted fiber to oxidize the fiber at a temperature of 245°C to 305°C in a gaseous atmosphere. The fireproof fibers are formed just under heating the contacted fiber to oxidize the fiber at a temperature of 245°C to 305°C in a gaseous atmosphere. Fibers before this process are not fireproof and the fireproof fibers are not soluble in organic solvent.

Furthermore, the Applicants respectfully submit that Ono does not teach dissolution in dimethylformamide as a step in the actual process of making the final flame-resistant fiber. Instead, Ono teaches the degree of solubility in dimethylformamide merely as an indicator of the degree of modification of the acrylic fiber caused by treatment with hydroxylamine. (See Ono, column 3, lines 65-68). Indeed, the working examples in Ono do not specifically teach a step of contacting the fiber with dimethylformamide and mention only solubility in dimethylformamide as an indicator of a characteristic of the fiber.

As further evidence that Ono's process does not include dissolving a fiber in a polar organic solvent, the Applicants invite the Examiner to consider Ono's teaching of filtering out the dissolved portion of an acrylic fiber as waste when determining the solubility of the fiber. (See Ono, column 5, lines 1-25.) The Applicants respectfully submit that if Ono taught a process for making fire-resistant fibers from fibers dissolved in dimethylformamide, it would not teach disposing of the dissolved portion as waste.

Moreover, an object of Ono is a process that includes the steps of modifying an acrylic fiber, which includes contacting the fiber with hydroxylamine and heating the fiber in order to confer fireproof properties to the acrylic fiber. Because the acrylic fiber would be partially destroyed by treatment with dimethylformamide and dissolved away as waste, it is contrary to the object of Ono's process to dissolve the fiber in dimethylformamide.

In contrast to Ono's modified acrylic fiber, the claims rejected above are drawn to a solution comprising a flame-resistant polymer denatured with an amine compound and dissolved in a polar organic solvent. The solution is capable of being formed into a formed product. Ono does not disclose such a solution. Accordingly, the Applicants respectfully submit that Ono does not teach or disclose each and every element of Claims 1-3, 7, 11-13, 18-20 and 22. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1-7, 9 and 10 stand rejected under 35 USC §102(b) as anticipated by Chiang. The rejection states that Chiang discloses a polyacrylonitrile polymer that is dissolved in DMSO and denatured with an amine compound.

The Applicants respectfully submit that Chiang fails to teach to teach each and every element of Claims 1-7, 9 and 10. Claim 3 recites a "flame-resistant polymer-containing solution containing a flame-resistant polymer and a polar organic solvent, wherein the flame-resistant

polymer is denatured with an amine and is obtained by using an acrylonitrile polymer as a precursor.” The Applicants’ Specification teaches that an acrylonitrile polymer may be a precursor of the flame-resistant polymer, however, the precursor polyacrylonitrile polymer is heated in the air before preparing the solution. (See Applicants’ Specification at paragraph [0060].) Heating the polyacrylonitrile precursor in atmosphere, such as at 200 to 300°C, results in cyclization and oxidation that confers flame-resistant properties to a polymer that might otherwise be flammable. (See Applicants’ Specification at paragraph [0008].)

Acrylonitrile polymers that have not been specially treated, like those described in Chiang, lack flame-resistant properties and would not be considered a “flame-resistant polymer.” Chiang teaches polymerizing acrylonitrile in dimethylformamide and then directly dissolving the resulting polyacrylonitrile in DMSO and adding an amine to the solution. (See Chiang, pg. 1624.) Chiang does not teach that the polyacrylonitrile polymer has flame-resistant properties, nor does it teach a process for making the polyacrylonitrile polymer flame-resistant prior to treating the polymer with an amine and dissolving the polymer in an organic solvent. Accordingly, the Applicants respectfully submit that Chiang fails to teach the flame-resistant polymer-containing solution as recited in Claims 1-7, 9 and 10. Reconsideration and withdrawal of the rejection is respectfully requested.

Claim 8 is rejected under 35 USC §§102 and 103 as anticipated or alternatively obvious over Ono. The rejection states that the Ono teaches a process for treating an acrylic fiber dissolved in dimethylformamide with hydroxylamine and that the acrylic fiber has a solubility of not more than 50% in dimethylformamide at 90°C. The rejection concedes, however, that Ono fails to teach the weights of the solid component remaining in heating the flame-resistant polymer-containing solution in nitrogen at a rate of 50°C/minute up to 300°C. The rejection

assumes that a solution disclosed in Ono is that same as the solution recited in Claim 8 and would have the same concentration by weight.

As discussed above, Ono does not teach modifying an acrylic fiber in which the fiber is actually dissolved in dimethylformamide. Thus, one skilled in the art would not understand Ono as teaching a flame-resistant polymer-containing solution containing a denatured flame-resistant polymer dissolved in a polar organic solvent, as recited in Claim 8. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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